Russian Tank Expositions Focus on Tank Upgrade Kits

by Lieutenant Colonel John C. Paulson

What's old is new again. Last year, the Russian Ministry of Defense sponsored two military equipment expositions in Omsk, Siberia, and Nizhniy Tagil in the Urals. While the T-80U and T-90 were displayed at both shows, the expositions focused on marketing upgrade kits for older version tanks rather than showcasing new breakthroughs such as the Black Eagle or the T-95 tank.

The exposition in Omsk, VTTV Omsk 2001, was sponsored by the Design Bureau of Transport Machine Building (KBTM) at the Omsk tank plant and was the regularly scheduled show for 2001. The Russian Defense Exposition (RUDEX), held in Nizhniy Tagil, is normally conducted during even-numbered years. RUDEX 2001 was a special show held in July 2001 to commemorate the 60th anniversary of the Nizhniy Tagil tank plant.

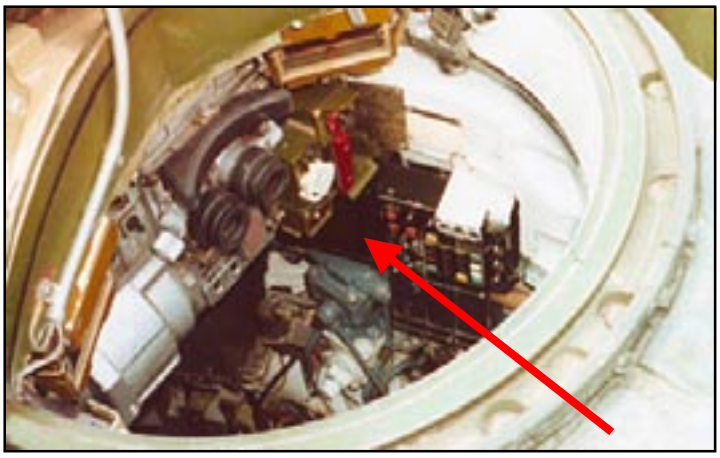
A Russian T-80U "flying tank" is shown above in a demonstration at RUDEX 2001.

VTTV Omsk 2001

Let's begin with the Omsk exposition, where a wide variety of Russian vendors displayed combat, combat support, combat service support vehicles, small arms, optics, thermal sites, uniforms, and other military accessories. In 1997 and 1999, the Black Eagle tank drew a great deal of interest and was demonstrated on a combat mobility course. This year, the Black Eagle failed to appear. When asked about its conspicuous absence, representatives from the Omsk tank plant stated that the tank was not yet ready for the next stage of demos, but that in 2003, the tank would likely be seen again.

The Omsk tank plant produces the T-80UM1 (improved) and displayed it at the 2001 venue. Few changes have been made over models previously displayed at the 1999 Omsk exposition; however, the tank's digitization appears to have improved. The display T-80UM1 boasted digital computers for the TC and gunner and offered a built-in test system and self-tests for various fire control checks. This year's tank also showed a digital data bus system. During a demonstration of the fire control checks for the tank, the demonstrator found a maintenance fault in the tank. He ran a fault isolation test and isolated the problem, which was fixed on the spot. Additionally, this model offers the active protective systems (APS) Shtora-1, Drozd, or ARENA-E as options. The APS's controls and warnings can be displayed on these digital boxes.

The T-80UM1 gunner's station has a thermal sight, and both the TC and gunner stations have small video screens that display exactly what the gunner views through his thermal sight. The Russians advertised that foreign customers can choose to add a foreign-made thermal sight to the tank. (The Ukrainian-made T-84 has demonstrated the incorporation of the French SAGEM



At left, the arrow indicates the digital box in a T-80U (improved) commander's station; above, a T-80UM1 (improved) turret with ARENA-E active protection system.

All photos by author

The T-55 above, equipped with modernization kit, is shown in a demonstration at the Omsk show; at left, with a 125mm cannon and built-in ERA; and below, with modernization kit and ammo bustle compartment.

2d generation FLIR.) The Russian 2d generation Nocturne thermal sight is also available for export.

The T-80UM1 also offers a 2A46M-4 main gun. In 1999, the tank showed a muzzle reference sensor (MRS) on the end of the gun tube. This year the muzzle reference device was missing. The Russians still advertise a "20 percent increase of fire effectiveness" over the 2A46M-1 main gun in the standard T-80U. The tank is capable of firing APFSDS, HEAT, HE-Frag main gun rounds, and 9M119/9M119M antitank laser-guided missiles. The T-80U brochure states that the REFLEX laser-guided missile system is intended to engage land and low-altitude aerial targets at a range of 100 to 5,000m. During the firepower demonstration, both the T-80U and T-90 shot missiles at a distance of approximately 5km. All rounds were dead-center target hits. The tank carries 45 rounds total. There are 28 rounds available in the autoloader carousel and 17 rounds stored in the hull.

The 46-ton T-80UM1 has an air conditioning system (turbo cooler) that reliably and effectively cools the electronics and crew compartment in hot weather conditions and is also equipped with a fire-suppression system and an NBC protection system. An electromagnetic wave deforming coating, referred to as "dazzle paint," covers most of the tank's surface and is used to prevent radar detection.

The driver's steering laterals have been replaced with a steering wheel. The tank has an improved GTD 1250G hp multifuel gas-turbine engine with (according to a brochure) a hydraulic volume-tuning mechanism producing a 29 percent increase in average speed on winding routes while reducing fuel consumption by 9 percent over the standard GTD 1250 turbine. Dubbed the "flying tank" at the 1999 show, the T-80U has a higher power-to-weight ratio than any modern main battle tank in the world.

The maximum range for the tank is listed at 440km with external fuel tanks and 335km without external tanks. The vehicle's maximum speed is listed as 70 kph highway and 40 to 45 kph cross country.

Additional features on the tank include a small turbine 18kW GTA-18 under armor auxiliary power unit (UAAPU). This UAAPU powers operation of all the tank's systems when the main engine is switched off. The GTD 1250 engine has an automatic air cleaning system and a one-point refueling location for the fuel tanks.

For additional protection, the T-80UM1 can mount either the Shtora or ARENA active protection systems. The complex Shtora-1 optical-electronic countermeasures system has a 360-degree laser emission detection system and an aerosol grenade screening system. The brochures claim Shtora triples the protection of the tank.

ARENA-E Active Protection System. The complex ARENA-E system is also available on the T-80UM1 and was displayed on one of the tanks at the expo. ARENA is an active protection system against rocket grenades and ATGMs that can detect incoming missiles at 50m with an automatic system reaction time of .07 seconds. The system has a 360-degree radar mounted on top of the turret. A series of grenades

are mounted on a ring along the front 110-degree arc of the turret. The range of speed for the missiles the system can engage is between 70 to 700m per second. Once a ground or air launched missile is detected, the ARENA system launches a grenade in that sector at approximately a 70-degree angle; the grenade then shoots down at the incoming missile to destroy or deflect it before it hits the tank. The danger zone for dismounted soldiers is a conical area of 20 to 30m around the tank. The combined protection level of a tank is claimed to increase five-fold with Shtora and ARENA. The ARENA system is available for the T-80 tanks, T-90, T-72C, and BMP-3.

Modernized T-55 Upgrade

Mentioned earlier, the focus of both the Omsk and Nizhniy Tagil exhibitions was not new equipment, but rather upgrade packages available for older tanks. The KBTM displayed a modernized T-55 with 125mm gun. This tank appeared to have a Black Eagle-style turret mounted on an upgraded/uparmored T-55 chassis. The weight was listed as between 43-44 tons with a power-to-weight ratio of 18.8 hp/ton. The advertised maximum speed of the upgraded tank is 50 kph and it has a max cruising range of 500km. The tank has an electric turret drive, fires a laser-guided missile and the gun is stabilized in both the horizontal and vertical axis.

A major change in this tank is that it has a conveyor type enclosed autoloader mounted in the turret bustle with 22 rounds readily available in the autoloader.

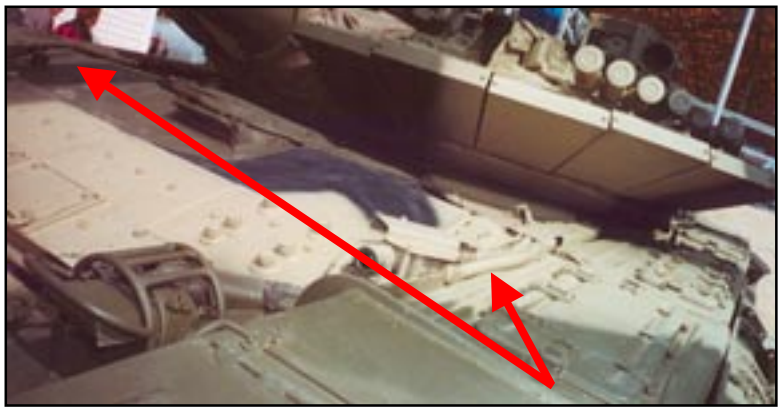
Another change can be found in the tank's frontal armor, which appears to have advanced explosive reactive armor (ERA) built into it. The protection level is stated as equal to the T-80U tank. According to the engineers at the vehicle display, a wide range of thermal sights were available as options for potential customers. Although prices were not provided, the engineers stated that it was considerably less expensive than a new tank.

KBTM also displayed brochures that had what appeared to be this same turret listed as a "Cal. 125mm welded turret to mount on the main battle tank chassis." The brochure depicted drawings of the tank with the turret mounted on the chassis of a T-62, U.S. Army M48, U.S. Army M60, and the German Army Leopard 1. The brochure states: "The welded turret possesses the protection level equal with those of main battle tank and is equipped with an advanced fire control system and autoloader which is enclosed into a detachable armored container mounted on the turret rear."

T-55 Modernization Kit. For shoppers with a smaller budget, the KBTM firm offered a much less expensive option for upgrading the T-55. It was displayed as a T-55 tank modernization. This tank maintains the standard

RUDEX 2001

The modernized T-72 tank at left is fitted with the Shtora system; below left, the NHK-4M commander's sight; and lower right, the front slope of a modernized T-72 with anti-mine tubes.



T-55 turret, but has an automated fire control system and guided missile system. It adds a 12.7mm anti-aircraft machine gun. The tank's survivability improvements are achieved by built-in ERA and a smoke grenade launcher system.

The upgrade kit includes a modernized commander's sight (TKH-1CM); advanced communications (details not stated, but appeared to be improved radio and intercom system); mine resistance improvement measures (similar to that of the T-72 improvements listed below); full hull length anti-HEAT side skirts. The tank also has a new driver's day/night vision device, a 620 hp V-55 diesel engine, and rubber-bushed tracks with increased ground grousers. The tank kit can be tailored to the customer's desires. The full suite of improvements is stated to increase combat effectiveness of the T-55 by 2.1 to 2.2 times a standard T-55. The kit is listed as a very affordable option to buying new main battle tanks.

Nizhniy Tagil RUDEX 2001

The RUDEX 2001 displayed military and commercial equipment made in the area. There appeared to be more commercial industrial equipment displayed at this show than with previous shows. The highlight of the show, and the only vehicle that had not been seen previously, was the modernized T-72M1, presented by Uralvagonzavod. The placard in front of the vehicle read "experimental prototype." The chief designer of the vehicle stated that the upgrade package was considerably less expensive than buying a T-90 or T-80. The package was available for Russian army and foreign customers.

The modernized T-72M1 tank weight increased from 43 to 45 tons. It has a power-to-weight ratio of 22.2 horsepower-to-ton with a B92C2 1000 hp diesel engine. The tank is also offered in the 840 hp version, and the average speed of the vehicle has been improved to 45 kph cross country and 65 kph on paved roads. The added weight and increased horsepower of the engine required some improvements to the transmission. One of the improvements made by Uralvagonzavod was to harden the planetary gears.

The upgraded T-72M1 has the 2A46M 125mm smoothbore cannon (same as T-80U and T-90). The tank can fire standard tank SABOT and HEAT rounds and can also fire the 9K119 laser-guided missile at ranges of up to 5,000m while on the move during both day and night operating conditions. The 12.7mm commander's machine gun can be fired while buttoned up with its electromechanical remote control.

The gunner's station in the improved T-72 has an upgraded thermal night sight. It is a French-designed Thompson 2d generation FLIR made with the assistance of Belarussian and Russian technologists. The upgrade package has a combined optical, thermal, and laser missile guidance channel. The sight is stabilized in both the vertical and horizontal planes. Identification range is between 3,000 to 35,000m. The tank also has the TNHK-1 sight as a back up.

The commander's sight is an NHK-4m day and night sight (passive) that is stabilized in the vertical plane only. The commander's fire control is also tied in with the gunner's thermal sight. The commander has a TV monitor that displays the gunner's sight picture and allows the commander to fire the main gun bullets or missiles using his monitor.

The tank also has an automatic target-tracking device. The chief designer explained that this autotracker works similarly to those in helicopters and fixed wing aircraft. Once the gunner tracks a target for approximately two seconds, and lases to the target, the system will automatically track the target.

The tank is advertised to have 1.25 to 1.8 times the level of protection over the nonmodernized T-72M1s. This claim is due to some increase in armor package, improved explosive reactive armor around the turret, and the Shtora-1 system. The sharply angled improved ERA looks almost like an ARENA grenade ring package. The chief designer stated that the package was a cooperative effort between NII Stali and Uralvagonzavod. It has four radar-laser warning receivers — two in the front and two in the rear. The tank also has an electromagnetic protection system that protects against mines and antitank guided missiles with magnetic induction fuses. The antimine system is a series of metal tubes that surround the entire upper hull of the vehicle.

Other improvements included on the upgraded tank include a Glasnost space navigation system (similar to global positioning system). The tank also has an improved in-tank fire extinguishing system and is available with metal or rubberized track pads. The T-72M1 is yet another example of Russian tank-builders focusing on improving legacy systems for domestic and international customers instead of developing new tanks. This is a reflection of the large number of these systems already in foreign inventories and domestic Russian inventories.

The Russians put a lot of effort into producing these shows, and both were clearly world-class arms and industrial expositions with military and civilian leaders from around the world in attendance. There appeared to be a lot of interest in the upgrade packages of the T-55 and T-72 by foreign military representatives. It is clear by the technology represented at these expositions that the Russians continue to build on their successful active protection systems. They are making improvements to their thermal sight capability, and are following the western trend toward bustle stowage of ammunition as a lesson learned from the Gulf War. Thousands of T-55s and T-72s remain in the inventories of many nations. These low-cost upgrade kits may change the countries that still maintain these ancient tanks back into very lethal and ubiquitous forces.

LTC John C. Paulson has written numerous articles on foreign tanks. He has traveled to Russia to visit tank expositions on three separate occasions. He also participated in the Greek and Turkish International Tank Trials. Commissioned as an armor second lieutenant from the U.S. Military Academy in 1981, he has served in a variety of armor assignments with 2-64th Armor in Schweinfurt, Germany; 2-10 Cav, 194th Armored Bde, Fort Knox, Ky.; and as the S3 and XO of 3-8 Cav, and G-3, Force Modernization, 1st Cavalry Division, Fort Hood, Texas. He has also served in several acquisition assignments, first as M1A2 Test Officer for PM Abrams, APG, Md., and later as Training Division Chief, TRADOC Program Integration Office - Army Battle Command System, Fort Leavenworth, Ks. He is currently assigned to the Project Manager's Office, Abrams Tank System.